

REMARKS/ARGUMENTS

Interview Summary

Applicants are appreciative of the Examiner granting a personal interview with their legal representative, Jeffrey N. Cutler, on November 19, 2004. In the interview, the primary references (U.S. Patent No. 5,319,204 issued to Wong, U.S. Patent No. 3,919,556 issued to Berninger, and U.S. Patent No. 5,753,917 issued to Engdahl) were discussed relative to the claims as they currently stand.

As explained in the interview, and as further discussed below, Berninger and Wong are divergent in their technologies with respect to Anger. Applicants understand that Anger has not been cited, and as the Examiner stated, is old in the art. However, it must be looked at to determine the advancements made by others such as Berninger and Wong. When putting these references into perspective with Anger, it is clear to one skilled in the art that the improvements taught by each move away from Anger in opposite directions, with Berninger replacing the refractive fluid with a light guide having a convoluted surface as a result of the convexly-shaped photodetectors, whereas Wong eliminates the light guide altogether.

It was argued by the Examiner that the optical coupling disclosed by Wong was equivalent to a light guide, and therefore this argument of diverging technologies is moot. However, one skilled in the art would recognize a bonding agent used to establish optical coupling cannot serve the same purposes or functions as a light guide, and conversely, that a light guide cannot serve the same purposes or functions of an optical coupler. To wit, bonding agents have not, to Applicants' knowledge, been held out as being an equivalent to a light guide. More specifically, the bonding agent which establishes optical coupling serves only to remove any air gaps from between the two objects being optically coupled.

With respect to Engdahl, it was submitted that a collimator is not an equivalent to a pixelized crystal block. The combination of Engdahl with a reference such as Wong is without motivation. First, as in the above combination, Wong specifically teaches away from the use of a light guide. It is understood that the Examiner's position is that Wong does not specifically state that he was removing the light guide

for any particular purpose, but it is pointed out that Wong does specifically state that the array of scintillation crystals are placed adjacent the light detectors. Due to the lack of disclosure of a light guide and the specific disclosure that the scintillator array is adjacent the photodetector array, it is respectfully submitted that one skilled in the art would recognize that Wong is teaching away from the use of a light guide.

The Examiner indicated that it would have been obvious for Engdahl to have used a pixelized scintillator crystal array in view of his use of collimators. However, it is respectfully submitted that Engdahl only anticipates the use of continuous crystals. Engdahl discloses two **embodiments**. In the first embodiment, as illustrated in Figure 1, a single camera is used, and collimators are disposed above the two scintillator crystals. This embodiment is discussed in detail. In his alternate embodiment, described at Col. 4, lines 13-29, two cameras are used and the collimators are removed. However, in this latter embodiment, the scintillators are not pixelized, which supports the understanding of Engdahl that a pixelized scintillator array having two layers of crystals of varying decay times is neither anticipated nor made obvious by Engdahl.

Arguments presented to the Examiner in preparation for the subject interview are presented below.

Summary of the Examiner's Actions

The examiner rejected Claims 1-5, 8-11, 14, 16-20, 22, 24-26, 29-32, 37, 38, 46-48 and 50 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,319,204 ("the '204 patent") issued to Wong, and U.S. Patent No. 3,919,556 ("the '556 patent") issued to Berninger, and further in view of U.S. Patent No. 5,753,917 ("the '917 patent") issued to Engdahl.

The examiner rejected Claims 6, 7, 12, 13, 17, 23, 27, 28, 33-35 and 39-45 under 35 U.S.C. § 103(a) as being unpatentable over Wong and Berninger and Engdahl and further in view of U.S. Patent No. 6,060,713 ("the '713 patent") issued to Skillicorn *et al.*, and U.S. Patent No. 5,521,378 ("the '378 patent") issued to Roscoe *et al.*

The examiner rejected Claims 15, 21, 36 and 49 under 35 U.S.C. § 103(a) as being unpatentable over Wong, Berninger and Engdahl and further in view of U.S. Patent No. 6,087,663 ("the '663 patent") issued to Moisan *et al.*

Applicant acknowledges the rejections under 35 U.S.C. § 103(a).

Rejections under 35 U.S.C. § 103(a)

It is noted at the outset that Claims 24-26, 29-32 and 37 depend from Claim 23 either directly or indirectly. By the Examiner's explanation of the rejection of Claim 23 under Wong, Berninger, Engdahl, Skillicorn *et al.*, and Roscoe *et al.*, and more specifically because Claim 23 was not rejected under the combination of only Wong, Berninger, and Engdahl, it is respectfully submitted that the Examiner's rejection of Claims 24-26, 29-32 and 37 is improper as stated. To wit, each of these claims includes all of the limitations of Claim 23, and if the cited Wong, Berninger, and Engdahl references do not disclose, anticipate, nor make obvious all of the limitations of Claim 23, then such references cannot disclose, anticipate or make obvious all of the limitations of Claims 24-26, 29-32 and 37. Accordingly, it is respectfully submitted that such rejection with respect to Claims 24-26, 29-32 and 37 should properly be withdrawn.

In order to support a rejection under 35 U.S.C. § 103(a), "the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness." MPEP § 2142, pg. 2100-121, 8th ed. "To reach a proper determination under 35 U.S.C. § 103(a), the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made." *Id.* The first element in establishing a *prima facie* case of obviousness is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings." MPEP § 2143, pg. 2100-122, 8th ed. The second element is that there "must be a reasonable expectation of success." *Id.* The third element is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *Id.*

The relevant facts for finding obviousness relate to (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of nonobviousness such as long felt need, commercial success, the failure of others, or copying. *Graham v. John Deere Co.*, 148 U.S.P.Q. 459, 467 (1966; see *Continental Can Co. v. Monsanto Co.*, 20 U.S.P.Q.2d 1746, 1750-51 (Fed. Cir. 1991). The Supreme Court in *Graham* stated that “the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved.” *Graham*, 383 U.S. at 17, 148 U.S.P.Q. at 467. The *Graham* court further stated that “[s]uch secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.” *Id.*

Common to each of these claim rejections is the Examiner’s assertion that the claims are obvious from a combination of Wong, Berninger and Engdahl. In order to establish a prima facie case of obviousness, the Examiner must show that each limitation of the rejected claim is disclosed in the cited references and that the references teach, suggest or disclose the motivation to combine the references so as to produce the claimed invention.

In this regard, it is respectfully submitted that the Examiner has not shown any teaching, suggestion or motivation to modify Wong’s PET camera so as to include a light pipe configured in the manner taught by Berninger. In this regard, the Examiner states that one skilled in the art would have been motivated to use a continuous light guide as taught by Berninger so as to provide “an optically transparent medium to satisfy the linearity and the position resolution of the gamma camera and will also provide a refractive index match between the scintillator and the detector, a feature necessary to decrease spurious light scattering.” See Page 3 of the Office Action.

Referring to the Berninger patent at col. 7, lines 4-32, it is clear that the addition of the light pipe medium 15 is not only the “major structural distinction”

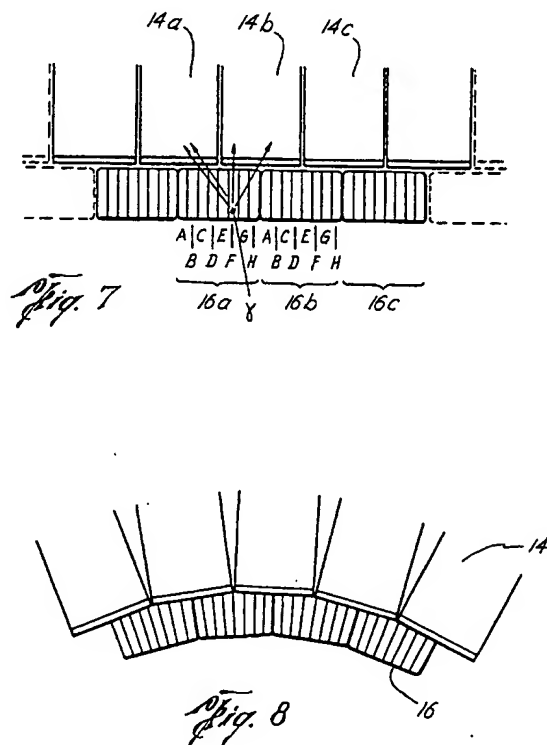
between that invention and the prior art relative thereto, but it is also necessitated by the use of convex photocathodes. Specifically, that paragraph states in part:

A major structural distinction between the prior art gamma camera ... and my invention ... is in the light pipe medium **15** utilized between the output face of the scintillator **11** and the photocathodes of the phototube array **12**. ... [I]n my invention the primary function of the light pipe is simply that of providing a refractive index match between the glass backing of the scintillator and the glass envelope of the phototubes. Thus, the input or scintillator end of my light pipe member **15** ... has a flat surface whereas the output end has a plurality of concave depressions conforming to the outer surfaces of the convexly curved phototube glass faceplates.

The prior art specifically referred to is that of Anger, disclosed in US Letters Patent No. 3,011,057. (see col. 1, lines 31-25 and col. 3, lines 48-51) The Anger camera includes a scintillator cover disk **39** that is spaced apart from the phototubes. The cover disk does not engage the phototubes as described by Berninger. On the contrary, optical fluid fills the volume defined between the phototubes and the cover disk. Accordingly, the conforming configuration of the Berninger light pipe essentially mirrors the function of the optical fluid used by Anger. In the Wong patent, the scintillator crystals and PMTs are cooperatively configured such that the crystals may be placed proximate the surface of the PMTs with little or no space therebetween. See, for example, Figs. 7 and 8 inserted below wherein the crystals and PMTs each define planar surfaces and wherein the crystals are disposed adjacent the input of the PMTs. Thus, while Berninger replaces the optic fluid of Anger with a conforming shaped glass light pipe, Wong has removed the optic fluid and simply moved the crystals to be adjacent the PMTs. Berninger and Wong each moved away from Anger in opposite directions.

It can be extrapolated that the element Berninger adds to the combination with Wong is a light pipe having an output surface configured to conform to the geometric configuration of the "sensitive" ends of the photo detectors. However, such element has not been claimed in the present invention.

As seen in the figures reproduced below and as discussed above, Wong does not utilize convexly curved photocathodes as taught by Berninger, collimators as taught by Berninger, or optic fluid as taught by Anger. Thus, one skilled in the art has no motivation to modify Wong's PET camera in the manner asserted by the Examiner.



Figs. 7 & 8, U.S. Patent No. 5,319,204

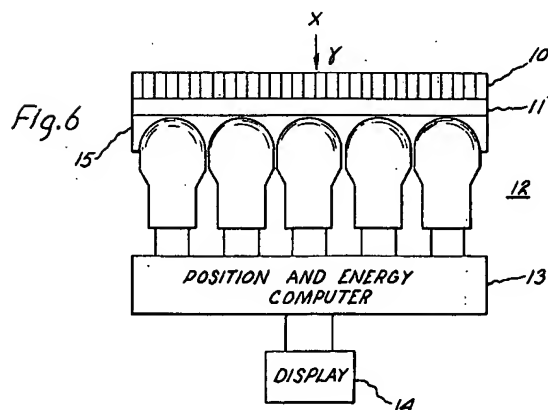


Figure 6 U.S. Patent No. 3,919,556

Moreover, Wong fails to teach the use of a light guide. In this regard, Wong states that "Figure 8 illustrates a plurality of arrays or blocks **16** of crystals **12** placed adjacent a plurality of PMTs **14**." Wong, Col. 7, lines 42-43. If one were to combine the teachings of Wong (using PMTs with planar input surfaces) with Berninger (including a light pipe having an output surface defining an array of concave surfaces), one would then be faced with a configuration somewhat analogous to that in Anger wherein a void would be created between the light pipe and the detectors, which would then be presumably filled with an optic fluid. In view of such, it is respectfully submitted that there would be no likelihood of success in making such a combination. At the very least, because there would necessarily be a further combination with Anger in order to make the Wong/Berninger combination succeed, the present invention lacks the element of an optic fluid, thereby supporting the conclusion that the Wong/Berninger combination is not obvious. Thus, again it is respectfully submitted that there is no motivation to modify Wong in the manner asserted by the Examiner.

The Examiner continued with respect to Engdahl stating that the '917 patent discloses "a scintillation crystal ... assembly having a first layer ... with a first decay constant and a second layer ... with a slower decay constant...." However, Engdahl fails to disclose an assembly wherein each of the first and second layers of scintillation crystals defines "a plurality of discrete scintillator elements" as claimed in the present invention. On the contrary, Engdahl specifically discloses the use of a collimator "for collimating photons incident of the crystal... ." Engdahl fails to discuss any alternative embodiments, and specifically whether the use of a collimator creates inefficiencies that might be overcome by replacing the collimator with a scintillator array including a plurality of discrete scintillator elements.

The crystal assembly employed by Engdahl is not new to that disclosure. As discussed at col. 3, lines 24-27, such an assembly is referred to as a "phoswich" crystal and has been used in significantly different applications. Even with its prior use in various other applications, and then with the use by Engdahl, there has not been disclosed the assembly of the present invention until this invention. It is respectfully submitted that there has been ample opportunity for those skilled in the art to have accomplished the present invention. However, such has not been accomplished until the present invention, and it is only obvious now by hindsight,

after the present invention has been disclosed. Because it had not been previously taught, it is respectfully submitted that there has been no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the cited prior art to achieve the present invention. Nor has there been a reasonable expectation of success of such combination.

It is respectfully submitted, then, that the cited references do not teach, suggest or disclose the motivation to combine the references in the manner suggested by the Examiner. Specifically, each of the independent Claims 1, 17, 23 and 38 each claim a combination of elements that is neither anticipated nor made obvious from the prior art of record. It follows that Claims 2-16 depending from Claim 1; Claims 18-22 depending from Claim 17; Claims 24-37 depending from Claim 23 and Claims 39-50 depending from Claim 38 each claim a combination of elements that is neither anticipated nor made obvious from the prior art of record. Therefore the Examiner is respectfully requested to withdraw the 35 U.S.C. §103(a) rejections as to each of the pending claims.

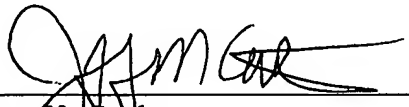
Summary

In view of the arguments made in the personal interview with the Examiner in which the present claims were distinguished over the prior art, as summarized above, and further in view of the arguments presented herein, it is believed that the above-identified patent application is in a condition for the issuance of a Notice of Allowance. Such action by the examiner is respectfully requested. If, however, the examiner is of the opinion that any of the drawings or other portions of the application are still not allowable, it will be appreciated if the examiner will telephone the undersigned to expedite the prosecution of the application.

Please charge any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 16-1910.

Respectfully submitted,

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